
THE BOTANICAL WORKS OF PHILIPPI, FATHER AND SON, IN CHILE¹

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ABSTRACT

Rodolfo Amando Philippi (1808–1904) was a leading figure in Chilean natural history, including botany. His son Federico Philippi (1838–1910) was a botanist during the same period and worked closely with him. We present an orientation to their works and the information available about them. Both Philipphis collected widely in Chile; their principal field trips are summarized. The Philipphis' material, including types, is deposited primarily at SGO, but numerous specimens were distributed to other herbaria. The identification of type material is frequently complicated by sparse label data and many duplicates; lectotypes remain to be selected for many names. Although both Philipphis published widely in a variety of journals and languages, their descriptions of Chilean plants were published principally in Chilean journals.

Rodolfo Amando Philippi (1808–1904; Phil.; "Rodolfo," Stafleu & Cowan, 1983) was one of the most important scientists in the history of Chile. He was a key figure in the inventory and description of the country's natural richness, the development of education there, and the development of the collections and libraries of the Museo Nacional de Historia Natural. He was aided in these efforts by his son, Federico Enrique Eunom Philippi (1838–1910; F. Phil.). Their work spans 60 years during the time of Chile's greatest expansion of territory and development. As the leading field biologists of their day, one or both of the Philipphis were the first to explore much of the country, which their predecessor Claudio Gay had surveyed only from Copiapó to Chiloé. The Philipphis published more than 560 articles on the natural history of Chile (R. A. Philippi: ca. 453 articles; Federico: ca. 109 articles) in a variety of Chilean and European journals, mostly in Latin, Spanish, and German. These articles cover notably (but by no means exclusively) paleontology, avifauna, entomology, exploration, anthropology, minerals, marine mammals, molluscs, plants, and general observations of their numerous field trips. The Philipphis, particularly R. A. Philippi, were highly regarded by their colleagues.

Of their various fields of interest, botany was foremost for both men. R. A. Philippi was prolific in both the field and the herbarium, and ultimately described 3720 new species of plants from Chile

(Muñoz-Schick, 1973). Federico collected material that his father described; he himself described 33 new species of plants (listed by Gotschlich, 1910, and Gunckel, 1939), most in publications compiled by his father. He was the first head of the Sección Botánica of the Museo Nacional, where he curated specimens and compiled an updated catalog of Chilean plants (F. Philippi, 1881), and he followed his father as professor of botany at the University of Chile, and director of the Jardín Botánico at the Quinta Normal.

In addition to the large number of works published by the Philipphis, much has been written about them and their work. Here we concentrate on the botanical aspects of the combined works, to orient contemporary botanists to some of the common difficulties encountered in interpreting the Philipphis' work and indicate useful sources of further information. The most common problems remain sparse documentation on their specimens and the Philipphis' very close collaboration, to the point that in later years even their individual handwriting became difficult to distinguish.

A BIOGRAPHICAL SKETCH

Detailed biographies have been published, most focussing on one or the other Philippi but documenting the lives of both by necessity (Barros-Arana, 1904; Gotschlich, 1904, 1910; Gunckel,

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1939; Muñoz-Schick, 1991). We present here a brief outline of both lives, with an emphasis on botanical activities.

R. A. Philippi was born just outside Berlin, and studied natural history in institutions in Switzerland and Berlin. He eventually obtained a medical degree but did not practice. He traveled widely in Europe as a young man, notably in Italy. Federico was born during his father's last stay in Naples (reportedly during an eruption of Vesuvius; Gotschlich, 1910). R. A. Philippi eventually settled into a teaching position in the newly established Polytechnic School in Kassel, where he spent 16 years. He published numerous articles from there, particularly on paleontology, molluscs, and the geology of southern Italy. He was widely known in the contemporary scientific community, and his works were recognized with medals from German and Italian rulers. However, he eventually found himself on the inconvenient side of a political upheaval in the duchy of Hesse, and left Kassel (precipitously and late on a cold December night; Barros-Arana, 1904). His brother was then organizing German colonization in southern Chile, and at his urging R. A. Philippi visited Chile. He arrived in Valparaíso in late 1851, in the midst of a civil war, and made his way south to the German colony near Valdivia. He made one exploring expedition inland in 1852, and then together with his brother acquired the Fundo ("Estate") San Juan along the Río Bueno.

Federico arrived in Chile in late 1853 with the rest of the family and his father's library. The family embarked in response to the father's decision to stay some time in Chile, and the news of his appointments in 1853 as director of the Museo Nacional de Historia Natural and as professor at the University of Chile. Here he taught natural history and wrote a textbook that presented ideas of evolution. But it was his exploring and collecting that developed the Museo Nacional into an active research center. This museum was established in 1830 by Claudio Gay, who deposited the collections that formed its basis when he left Chile in 1842. In 1876 R. A. Philippi moved the collections to their present site in the Quinta Normal de Agricultura, where the Jardín Botánico was later established.

R. A. Philippi lived in Santiago most of the year, visiting his family near Valdivia for two months in the summer and using much of this time for field studies. Federico remained with the family on the San Juan estate until his first wife's death in 1871, when he traveled to Europe to study botany and zoology. He returned in 1874 to take over his

retiring father's teaching duties, and in 1889 became head of the newly established Sección Botánica of the Museo Nacional. In 1883, Federico also succeeded his father in the directorship of the Jardín Botánico, and in 1897 he resigned from both the Sección Botánica and the Jardín Botánico to succeed his father as director of the Museo Nacional. Following Federico's return from Europe, father and son lived together in Santiago, eventually on the grounds of the Jardín Botánico, and worked closely together.

COLLECTING EXPEDITIONS

Both Philippis were active field workers throughout their lives, even though both suffered health problems. R. A. Philippi visited Italy principally to improve his weak constitution; this apparently worked, for he was 82 years old when he undertook his walking trip from Concepción to Arauco. As a child Federico contracted meningitis, and he remained crippled by malformed legs and feet for the rest of his life.

Their principal expeditions and collecting efforts are outlined in Table 1. A detailed list of the names and precise locations, including latitude and longitude, of the Philippis' collecting localities has been presented previously by Muñoz-Pizarro (1960), Muñoz-Schick (1973), and Muñoz-Schick & Prina (1987). The scientific impact of the Philippis' discoveries has been discussed by Gunckel (1939). Some trips were undertaken by order of the government; for these a report was usually published by a government agency, in addition to the accounts sent to contemporary journals. It was not unusual for the Philippis to publish an account of the same trip in several different journals and to collaborate on the written accounts of trips made by one of them.

These trips brought discovery of many new and unusual phenomena. R. A. Philippi's 1852 trip around Osorno in the south produced some of the first maps of that region. His expedition in 1853-1854 to the Atacama desert was the first scientific exploring trip to that region, and he described presciently the difficulties later encountered in developing it as well as its lack of precious metals. In his 1864 trip through the Cordillera de la Costa near Valdivia, Federico Philippi visited the Cordillera Pelada, where he found a mountain range covered with a forest composed of millions of standing, long-dead *alerce* trees (*Fitzroya cupressoides* (Molina) Johnst., Cupressaceae), and also relictual pockets of Magellanic plant communities that were disjunct by hundreds of kilometers from their "nat-

TABLE 1. Principal travels of Rodolfo Amando Philippi and Federico Philippi in Chile. Precise locality information for most collecting sites can be found in Muñoz-Pizarro (1960), Muñoz-Schick (1973), and Muñoz & Prina (1987).

Dates	Travels
1852	R. A. Philippi; Río Bueno south of Valdivia, Volcán Osorno, Lago Llanquihue, Volcán Calbuco [X Region]
1853 (Nov.)–1854 (Feb.)	R. A. Philippi; by boat from Valparaíso to Coquimbo, by land to Copiapó, Atacama, Taltal (Atacama Desert) [V to II Regions]
1854–1856	R. A. & F. Philippi; various sites around Santiago and the adjacent Cordillera de los Andes [Metropolitan Region]
1858 (Dec.)	R. A. Philippi; Colonias del Sur [X Region]
1859 (Jan.–Mar.)	R. A. Philippi; Colonias del Sur [X Region]
1860	R. A. Philippi; Catemu [V Region], Laguna Ranco [X Region]
1860 (Jan.)	R. A. & F. Philippi; Fundo San Juan to La Unión, Daglipulli and adjacent Cordillera de los Andes, Lago Ranco [X Region]
1860 (late)	R. A. & F. Philippi, Quebrada de San Ramón [Metropolitan Region]
1862	R. A. Philippi; Nuevo Volcán de Chillán [VIII Region]
1863	R. A. Philippi; Nuevo Volcán and Baños de Chillán [VIII Region]
1864	R. A. Philippi; Juan Fernández Islands [V Region], Guayacán (Coquimbo) [IV Region]
1864 (Oct.)	F. Philippi; San Juan de los Cuncos, Cordillera de la Costa, Hueicolla, Cordillera Pelada [X Region]
1867	R. A. Philippi; Cauquenes [VII Region]
1875	R. A. Philippi; Ventisquero Cipreses [VI Region]
1875	F. Philippi; Laguna de Budi, Desembocadura (mouth) of Río Toltén [IX Region]
1877	R. A. Philippi; San Juan [X Region]
1877	R. A. & F. Philippi; Arauco, Malleco, Cautín, Cordillera de Nahuelbuta, Tres Piedras [VIII to IX Regions]

TABLE 1. Continued.

Dates	Travels
1878 (early)	F. Philippi; Termas de Chillán [VIII Region]
1878	R. A. Philippi; Coquimbo Province [IV Region]; Matanzas and Cahuil in Colchagua Province [VI Region]
1879 (early)	F. Philippi; Descabezado (headwaters) of Río Maule [VII Region]
1879 (early)	R. A. Philippi; Tomé, Quiriquina, Salto del Laja [VIII Region]
1880 (Jan.)	F. Philippi; east-central Chiloé, including Cucao and Ancud [X Region]
1880	R. A. Philippi; Isla Quiriquina (for fossils) [VIII Region]
1882	R. A. Philippi; Santa Rosa de Los Andes, Jahuel [V Region]
1883 (Jan.)	F. Philippi; Fray Jorge, mouth of Río Limarí, Baños del Toro [IV Region]
1883 (Mar.)	R. A. Philippi; Lebu, Arauco, Coronel [VIII Region]
1883 (Oct.)	R. A. Philippi; Curauma [V Region]
1884	F. Philippi; Valparaíso area including Concón and mouth of Río Aconcagua [V Region]
1884	R. A. Philippi; Valdivia, San Juan [X Region]
1885 (Jan.–Mar.)	F. Philippi, Carlos Rahmer (Sub-director and Preparator of the Museo Nacional), Pablo Ortega (Dissector of the Museo Nacional), Otto Philippi (grandson of R. A. Philippi and medical student); Valparaíso to Caldera by boat, to Copiapó by train, overland from Puerta de Paipote to Antofagasta de la Sierra, into Argentinian territory (Muñoz-Schick & Prina, 1987), San Pedro de Atacama, Laguna de Huasco, and Oasis de Pica [III to I Regions]
1885 (Sept.)	F. Philippi; Valparaíso to Caldera by boat, then overland along coast to Huasco [III Region]
1885	R. A. Philippi; Lebu, Arauco, Coronel, Renaico [VIII Region]
1886	R. A. Philippi; San Juan [X Region]
1887 (Apr.)	R. A. Philippi; Algarrobo [Metropolitan Region]

TABLE 1. Continued.

Dates	Travels
1887 (Nov.)	R. A. Philippi; Araucanía [IX Region]
1888 (Jan.)	R. A. Philippi; Alfalfal [Metropolitan Region]
1889	R. A. Philippi; Baños Colina [Metropolitan Region]
1890	R. A. Philippi; Concepción to Arauco [VIII Region]
1891	R. A. Philippi; Victoria, Los Angeles, Curanilahue, Arauco, Valdivia [VIII to X Regions]
1891 (Oct.)	R. A. Philippi; Quilpué [V Region]
1892	R. A. Philippi; Baños Chillán [VIII Region]
1893 (Sept.)	F. Philippi, Filiberto Germain (Head, Sección Entomología, Museo Nacional); Fray Jorge [IV Region]
1893	R. A. Philippi; Concepción, Curanilahue [VIII Region]
1894	F. Philippi; Yervas Buenas, Cauhuil, Matanzas [VI Region]
1896 (Mar.)	R. A. Philippi; Constitución [VII Region]
1896-1908	F. Philippi; various trips to Valdivia, Fundo San Juan, Cautín, Constitución [VII to X Regions]

ural" range in the south. The Philippis' joint trip in 1877 to the Cordillera de Nahuelbuta explored territory recently wrested from the control of the Mapuche ("Araucano") Indians, and Federico's 1884 trip northward surveyed territory recently acquired during the war with Peru and Bolivia. Federico first noted several unusual plant communities, including an isolated southern population of *Araucaria araucana* (Molina) K. Koch (Araucariaceae) just north of the mouth of the Río Toltén and a relict Valdivian forest north of Santiago at Fray Jorge, in the semiarid region. The Philippis' extensive botanical collecting and knowledge enabled them to recognize these unusual plant distributions and provided the basis for much of our current knowledge of the Chilean flora.

THE PHILIPPIS' SPECIMENS

Most of the Philippis' Chilean material, including types, is deposited in the Museo Nacional de Historia Natural in Santiago (SGO). This material was variously collected and annotated by one or both Philippis. Collections of Chilean plants sent to the

Philippis by others, notably Pearce, Volckmann, Solís de Ovando, Díaz, Landbeck, Fonck, Geisse, Juliet, Borchers, Germain, and King, were also incorporated into the SGO collection (Muñoz-Schick, 1991). All of these other collectors are identified on the sheets except Fonck, whose handwriting is distinctive (Fig. 1). There are duplicates of many collections, due to the ample material that was collected and Federico's maintenance of a personal herbarium at home. This personal collection contained duplicates of specimens deposited in the Museo Nacional. It was acquired by the Museo Nacional in 1911, after Federico's death; some of these specimens can be distinguished by their printed labels with black border and the legend "Herbarium Friderici Philippi" (Fig. 2; Muñoz-Schick, 1973: fig. 2). Many duplicate specimens were also distributed to other herbaria through gifts and exchange. This distribution had no particular system, and R. A. Philippi was noted for his enthusiasm and scientific generosity. Duplicate Philippi specimens from Chile are reported today to be found at BA, BAF, BM F, FI, G, K, L, LE, LZ, MA, P, SI, and W (Stafleu & Cowan, 1983), and are also found at CORD (Taylor, pers. obs.).

Samples of both Philippis' handwriting⁶ have been presented previously with commentary (Muñoz-Schick, 1973: figs. 1, 2) and are shown in Figure 2. Their handwriting was similar, and became more so as they aged. Although the collector of the specimen is frequently not noted, particularly on material originally deposited in the museum's collection, it can usually be determined by reference to the year and locality (Table 1).

The subsequent head of the Sección Botánica was Carlos (Karl) Reiche, who prepared a revised *Flora de Chile* (1894-1911). Reiche was familiar with the Philippis' specimens, and his commentary in this work is useful for selecting lectotypes. However, some of Federico's collections now in the Museo Nacional were purchased after Reiche's departure from Chile and were not seen by him. Reiche's handwriting is distinctive; his annotation consists usually of a single "R" (Fig. 3).

The types of species described by the Philippis are today housed in a separate collection. This was established by Muñoz-Pizarro when the specimens in the herbarium were mounted, a process that began in 1942 and continues today (Muñoz-Pizarro, 1960). Identification of Philippi types is sometimes difficult because of the sparse data on many specimens, the occasional inclusion of several collections on one sheet with no indication of which plant was accompanied by which label, and the frequent citation of more than one specimen in the

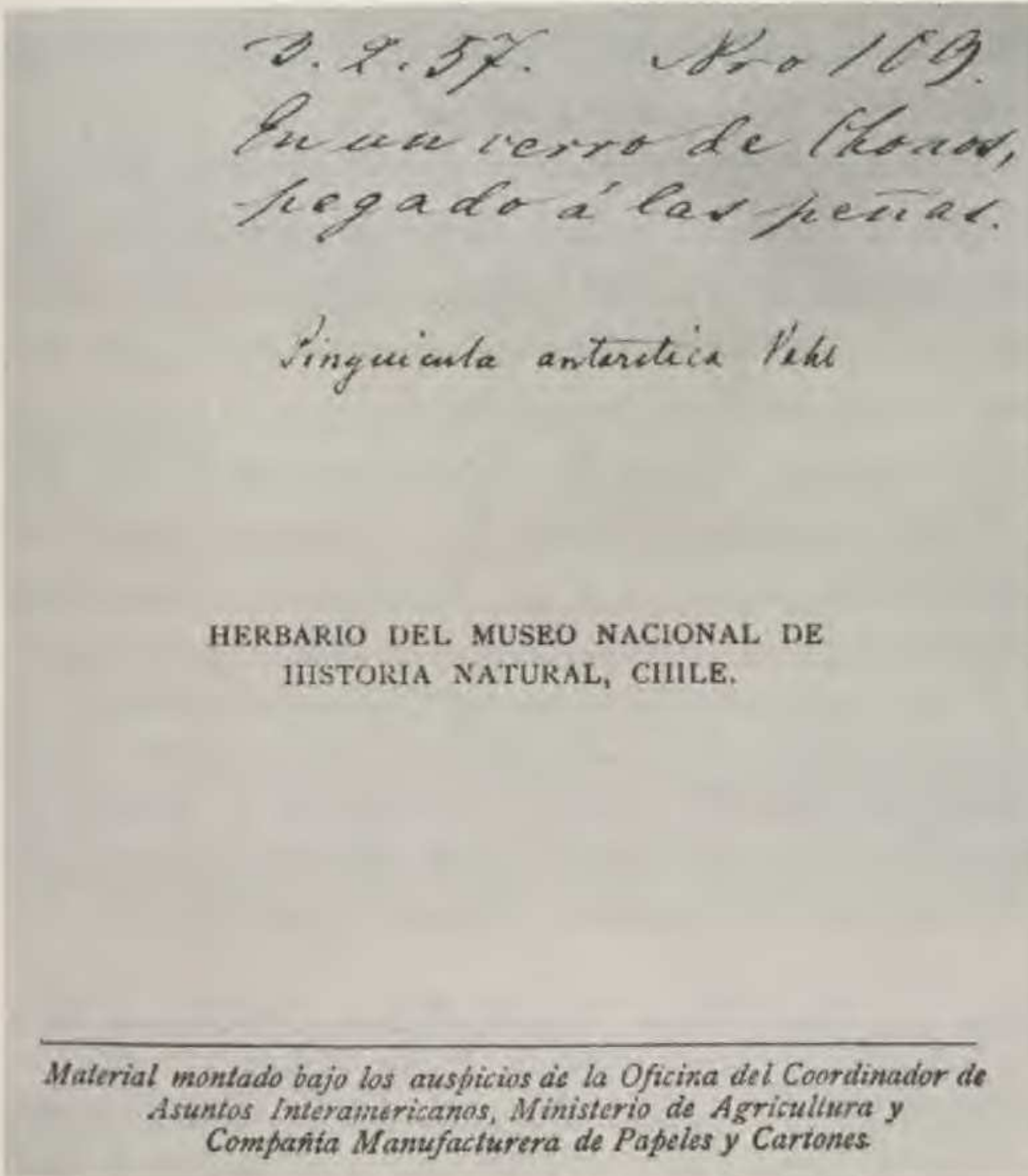


FIGURE 1. Handwriting samples: Collection data by Fonck (top portion) with annotation by R. A. Philippi (bottom portion).

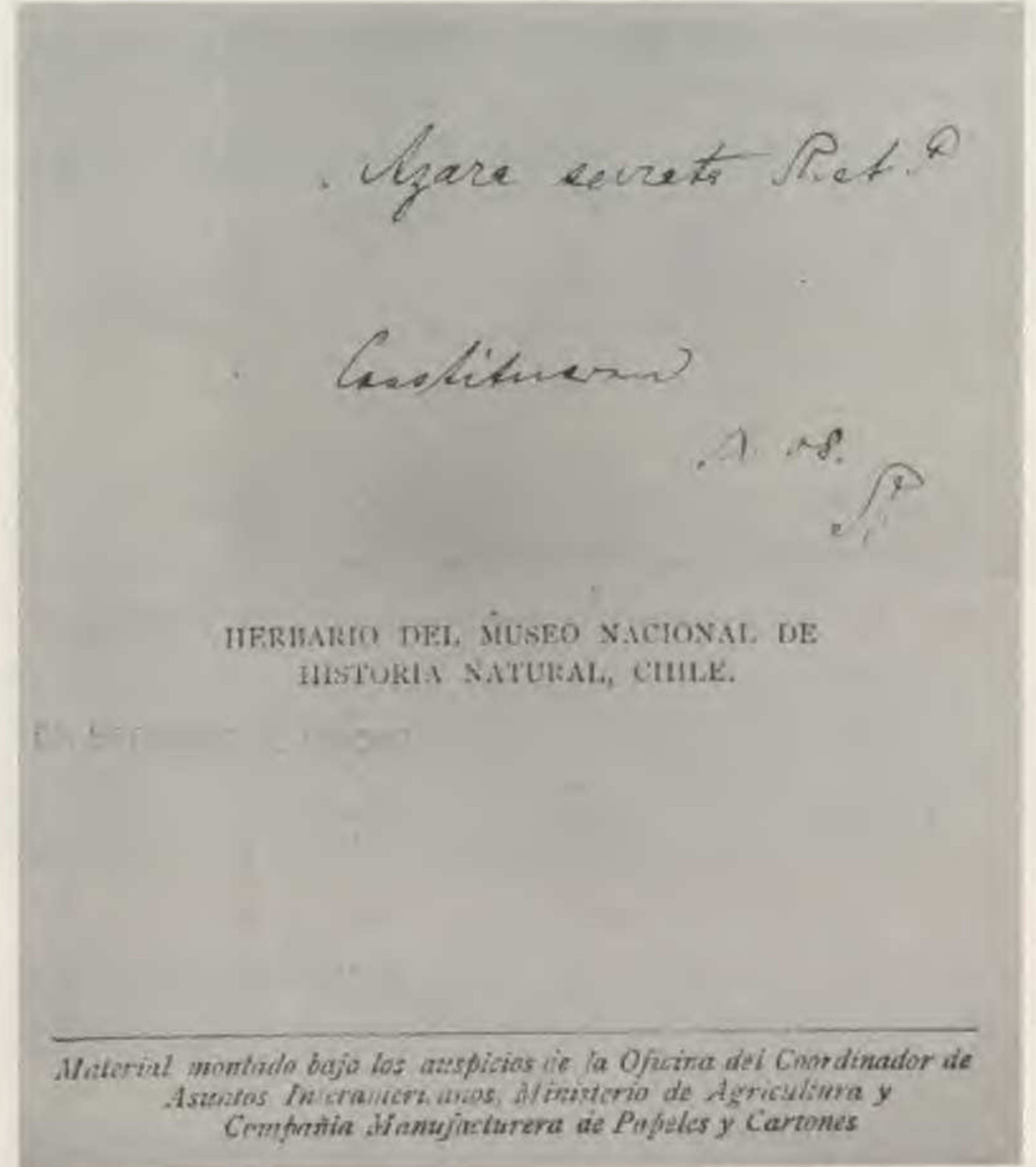


FIGURE 3. Handwriting sample: Label by Karl Reiche.

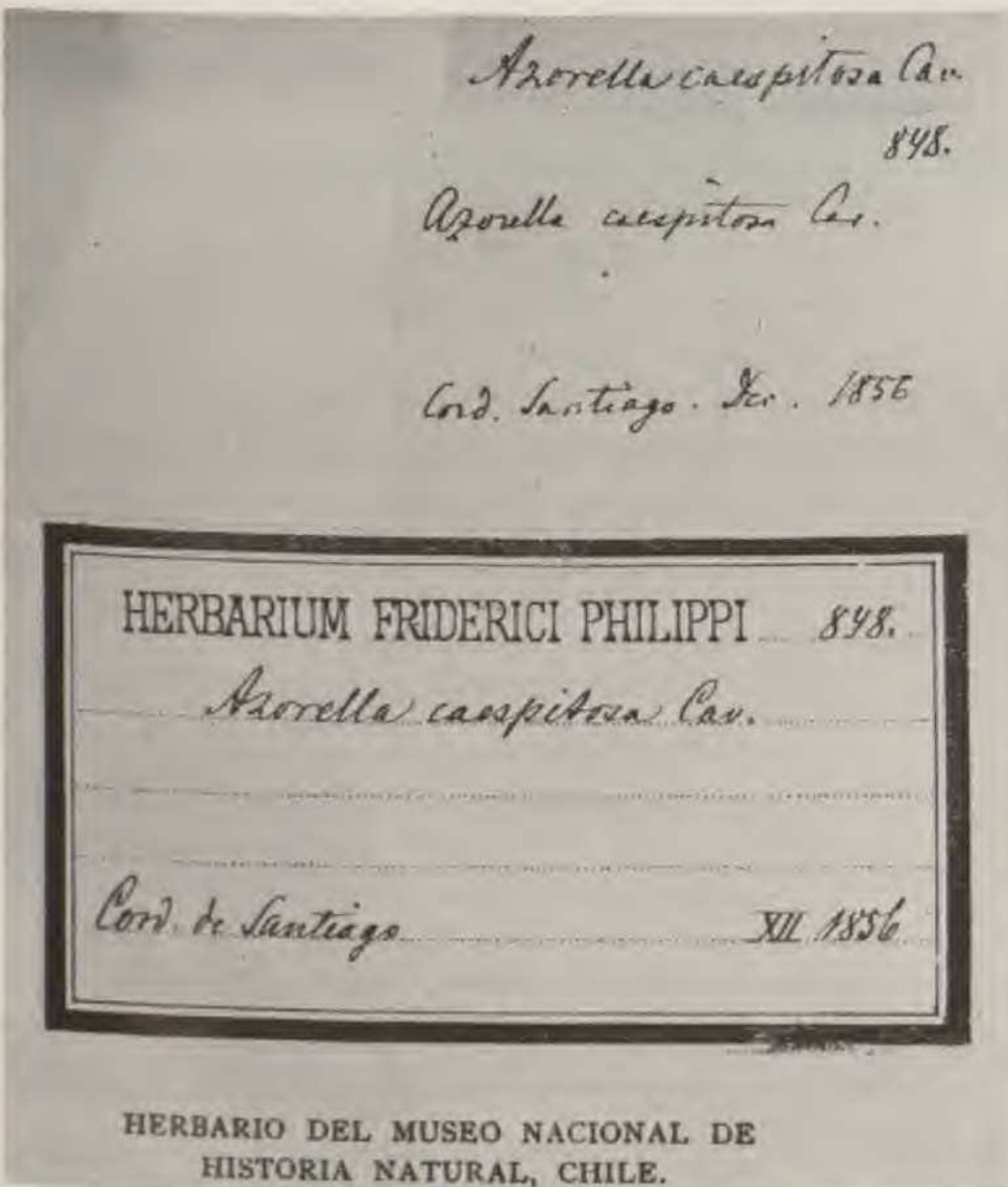


FIGURE 2. Handwriting samples. From top to bottom: annotation by Federico Philippi, label by R. A. Philippi, and label from Federico Philippi's personal collection with his handwriting.

original species description. The known syntypes in the SGO collection have been cataloged along with publication references, collection locality(ies), and SGO accession numbers by Muñoz-Pizarro (1960), with additions by Muñoz-Schick (1973). Neither of these authors attempted to select lec-

totypes, but concentrated on organizing the material to facilitate work by specialists.

The types of 323 species described by the Philippis remain unlocated (Muñoz-Schick, 1973). However, SGO still houses unmounted, unexamined, mostly duplicate Philippi material in its mounting backlog, and these may yet be discovered. Photographic negatives of both SGO's type material and historical collections of Chilean plants deposited in several European herbaria are available on loan from SGO for study and duplication; the cost of photographic prints, if desired, must be borne by investigators (Muñoz-Pizarro, 1963).

THE PHILIPPIS' PUBLICATIONS

Several bibliographies of works published by the Philippis after their arrival in Chile have been presented, including the collected works (Mostny, 1980) and the principally botanical works (Marticorena, 1992). The number of articles they published was multiplied by their habit, in particular R. A. Philippi's, of publishing the same material more than once. Their purpose was apparently not to enlarge their list of publications, but rather to disseminate their work to a wider audience and also to help struggling journals by providing articles.

We focus here on the Philippis' publications with respect to the flora of Chile, probably a slight majority of the works of R. A. Philippi and certainly most of the publications of Federico. Their publi-

cations can generally be divided into travel accounts, written by one or more frequently both Philippi, and descriptions of new species, written almost exclusively by R. A. Philippi.

R. A. Philippi's descriptions of new species were published principally in several series, although he did not limit himself to these. On a very few occasions he published a new species more than once, in different journals. The first of a series of new species was presented in sections in the German journal *Linnaea* between 1857 and 1865. In these accounts, written in Latin, the new species are grouped by families and numbered consecutively. There is a preface with the first section, and the other sections continue as in one publication. These species are usually based on specimens collected by the Philippi. In some cases a set of consecutive species may be based on specimens from one collecting trip, but this varies also.

Subsequently, R. A. Philippi published more new species in articles in various journals, predominantly Chilean ones. Several of these reported on expeditions by Federico and also other collectors, for whom many species were named. Two notable series of new species were published in the *Anales de la Universidad de Chile*, with descriptions in Latin and Spanish. The first series was published in 1870–1873 and described more than 500 new species. The second, "Plantas nuevas chilenas," was published in 1892–1896. The species in both series were presented following the order used by Gay (1845–1854), which generally follows the system of de Candolle's *Prodromus*. From 1889 on, the descriptions were prepared by both Philippi. The publication of the second series is detailed by Stafleu & Cowan (1983); all of the series are detailed by Marticorena (1992).

It was common during the Philippi's time to issue, in addition to the regular edition of a journal, numerous reprints ("separatas") of individual articles; each had its own pagination, which was often different from the original article. In some cases, the title may also have been changed slightly. These reprints are commonly encountered in libraries, particularly in Chile, as separate articles and in bound volumes of the works of a particular author. We recommend consultation of Muñoz-Pizarro (1960) and Marticorena (1992) as an aid to de-

termining the original publication date, site, and pagination of these articles.

Common nomenclatural problems seen in treatments of Philippi names are the inadvertent creation of *nomina nuda* by later authors, who adopted names that were distributed on specimens but were not published; incorrect citation of publication page number, based on the reprint rather than the original publication; and the incorrect citation of names attributed to R. A. Philippi but effectively published by later authors, most commonly Reiche.

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